

We Claim:

1. A device for effecting the photoelectric transport of charged materials in a liquid environment, comprising:

a substrate having a first face and a second face, the substrate capable of

5 generating a photocurrent;

a conductor contacting at least a portion of the first face of the substrate;

a permeation layer supported on the second face;

attachment entities coupled to the permeation layer;

a liquid in contact with the permeation layer;

10 an electrode in contact with the liquid; and

a light source disposed to illuminate at least a portion of the substrate, thereby to induce a current within the device.

2. The device of claim 1, wherein the substrate is adapted to generate a photo-current.

15 3. The device of claim 1, wherein the substrate is adapted to generate a photo electrochemical current.

4. The device of claim 1, wherein the substrate is a semiconductor.

5. The device of claim 4, wherein the semiconductor is an n-type semiconductor.

6. The device of claim 4, wherein the semiconductor is silicon.

20 7. The device of claim 1, wherein the conductor contacting at least a portion of the first face of the substrate is a film.

8. The device of claim 7, wherein the film is a copper film.

9. The device of claim 1, further comprising a chemical layer supported on the substrate.
10. The device of claim 9, wherein the chemical layer includes Mn₂O₃.
11. The device of claim 10, further comprising a metal layer disposed between the substrate and the chemical layer.
- 5 12. The device of claim 11, wherein the metal layer disposed between the substrate and the chemical layer is palladium.
13. The device of claim 1, comprising a containment structure disposed in fixed relation with the substrate.
- 10 14. The device of claim 13, wherein the containment structure includes a sheet-like containment system having an aperture through the sheet.
15. The device of claim 14, wherein the sheet is a Teflon sheet.
16. The device of claim 1, wherein the electrode is a ring electrode.
17. The device of claim 1, further comprising a reference electrode adapted to contact the liquid environment in contact with the device.
- 15 18. The device of claim 1, further comprising an optical fiber disposed between the light source and the device.
19. The device of claim 18, wherein the optical fiber is a single mode optical fiber.
20. The device of claim 1, wherein the light source includes a laser.